

AMERICAN VETERINARY REVIEW,

APRIL, 1888.

EDITORIAL.

The title page of our eleventh volume—error by the printer—our correction, and new title page—list of contributors to that volume—our thanks to those pioneers of American veterinary literature—efforts to render the REVIEW accessible to all—our future prospects—the REVIEW, born of the United States Veterinary Medical Association, has always paid its relative its respect—at times severe, but always just—the meetings in New York, Boston, Philadelphia and Baltimore—the last one probably the most useful and interesting of all—paper from Dr. Salmon on hog cholera—his claim—discovery of distinct diseases—European observation and discoveries coincide with the investigations made in America—Dr. Clement's handsome exhibition of specimens of pleuro-pneumonia lesions—their specific value at the various stages of the disease—paper on mediate contagion—Dr. Salmon's remarks—Prof. Law's answer to Dr. Gadsden—our suggestion on the subject seconded. Director Nocard's request—the fifth international veterinary congress to be held in September, 1889—the congress on tuberculosis to take place this year, in July—our confreres on this continent can become members and receive the publication of both by a small remittance to the treasurer of both. Two new veterinary journals, the *Ercolani* and the *Giornale di Veterinaire Militare*.

IN arranging the copy for the closing number of our eleventh volume, last month, we prepared a title page, together with a copious table of contents, for the benefit of such of our subscribers as might desire to preserve their numbers in a bound volume for easier reference to the subjects treated in the 570 pages through which we have communicated with our readers during the past twelve months. But through a misapprehension on the part of our printers, which it is unnecessary to explain here, the whole matter became wrongly arranged, and our design effectually mis-

carried. In order to rectify this accident, however, and remedy the harm, if any, has been done, we furnish with the present number a title page of Volume XI, more according to our first design, with an accompanying list of the names of the friends whose contributions have made the REVIEW what it is and what it has been, and to whom, with many others, we shall continue to look to communicate interest and value to our pages in the future.

In recapitulating the names of these gentlemen, we are but doing them simple justice. Considering the sparseness in numbers of contributors to veterinary literature in the United States, thus far, we should render all the more honor to those who have been among the earliest to occupy the field, and we trust that it will be long before we shall miss their names from among those who honor the profession of their choice by plying their pens for its advancement.

In beginning the twelfth volume of our magazine, we are glad to be able to assure our readers of the past success of the REVIEW, and while we contemplate with pride the progress already achieved in the past, we look with confidence to the future for a still more enlarged and permanent success, with a corresponding capability for usefulness and promise of prosperity.

Amongst a variety of plans for the advancement of our interest which we have recently had in contemplation, and in order to effect the introduction of the REVIEW into every veterinary office in the country, we have been considering the question of a reduction in our subscription rates. Peculiar complications, however, aside from any volition of our own, have interposed to prevent our coming to any definite determination of the question. But we are hopeful that as the result of sundry inquiries which we have instituted, and to which we are awaiting satisfactory answers, we shall soon be able to solve the problem.

The birth of the REVIEW occurred at a meeting of the United States Veterinary Medical Association, and being thus brought into existence, it has been both a duty and a pleasure with us, in the first number of each volume, to offer a sort of token of respect to our putative parent, by recording the proceedings of the meetings which the Association has for twenty-four years been accustomed

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to hold semi-annually in various cities of the Union. In printing these records the REVIEW has in many instances been obliged to exercise some degree of severity of judgment in its criticisms upon the doings and sayings of its venerated parent, and perhaps it has at times been irreverently forgetful of the difference between the ages of the party criticised and the party criticising. But if at times severe, we have never forgotten to endeavor always to be just, and we cannot be greatly blamed if our animadversions, taking into consideration the shortcomings of some—many—of the meetings, have been what they were. We reported the facts as they were, not as we wished them to be.

But if we have freely judged such occurrences as, for example, a certain meeting at which some of the members assisted once in New York, we have with gratification unrepressed spoken approvingly when we could candidly do so, of a different kind of assemblage. We spoke in just terms of certain profitable and pleasant meetings in Boston—we expressed our pleasure while recording a recent meeting in Philadelphia, with its agreeable features—we make fully known our satisfaction in reporting the latest of the meetings of the Association in Baltimore, which by those who attended it has been unanimously pronounced the best and most fruitful in useful results of all that have hitherto been held, not overlooking the very attractive and enjoyable social features pertaining to it, prompted by the characteristic hospitality of a genial people.

The meeting was ostensibly that of the United States Veterinary Medical Association, but in fact the Association became at once a guest of the little nucleus of genuinely good and true veterinarians who compose the Maryland State Veterinary Association, and right heartily was the work of the committee of arrangements performed.

The meeting took place in the halls of the Medico-Chirurgical Society of Baltimore, and a large representation of the profession was present, with veterinarians from nearly every quarter of the land. The routine of general business was rapidly carried through, and after a magnificent lunch prepared by the State Society for its senior guest, the United States Association, the principal business of the meeting was taken in hand.

First on the list came a paper on hog cholera by Dr. Salmon, who improved the opportunity to confirm and establish his priority of claim as discoverer, in respect to the various forms of disease in swine which veterinarians have for years considered and contended to be a single lesion. Dr. S. also gave a statement of the adoption of similar views by the European, and lately the French pathologists, as the result of their observations of recent outbreaks of diseases among swine, more particularly at Marseilles, within a recent period.

Dr. Clement spoke on the subject of the pathological lesions of pleuro-pneumonia-contagiosa and of tuberculosis. He exhibited before the Association a large collection of specimens of various kinds, without doubt the most valuable and interesting exhibit ever submitted to the inspection of a veterinary meeting.

Another of the important incidents of the meeting was the presentation of a second paper by Dr. Salmon, on a new subject. In a recent number of the REVIEW we printed a communication from Dr. Gadsden on the subject of "mediate contagion," and we at the same time suggested the propriety of such a discussion of the points presented by Dr. G., by such of our correspondents as have sufficiently considered the matter, as would tend to elicit the merits of the case and confirm or refute the newly advanced theory. Dr. Salmon's paper contained this answer to Dr. Gadsden, and to its publication in our present number* we add Dr. Law's contribution on the same subject. We are glad to see our suggestion so amply seconded, and trust that these papers will be read with attention and profit.

WE have received from Director Nocard, the General Secretary of the Organizing Committee, the circular of the Fifth National Veterinary Congress, called to meet in Paris during the month of September, 1889.

It is with pleasure that we comply with the request of our esteemed friend and colleague by calling the attention of American

*After waiting for the Secretary of the Association for several days after the meeting, we are obliged to postpone the publication of the paper, as the Secretary has failed to send it.

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veterinarians to the event, and we hope that our American colleagues will not remain silent to the call issued by their professional brethren on the other side of the Atlantic. The opportunity is a grand one, the work which will be done and the subjects to be discussed will be of great interest, and the other incidents which are intended to supplement the main event, will, we are sure, fully repay the cost and trouble of a trip to France. If our brethren individually are unable to go, delegates should be commissioned at the expense of our organized institutions, and the profession at large should also add their endorsement, in order to secure the publications which may issue from the Congress by the remittance of the small amount indicated in the circular, viz.: \$2.00.

But before the sessions of this French Congress take place another will have already been held, which has been called to convene in the month of July of the present year. This has been inaugurated for the discussion of the subject of human and animal tuberculosis. Four principal questions will come before this body, 1. The danger that attends the use of the meat and milk of tuberculous animals, with the proper means of their prevention. 2. Human races, species of animals, and organic media considered from the point of view of their aptitude to contract tuberculosis. 3. Methods of introduction and propagation of tuberculosis virus in the organism, and prophylactic measures. 4. Initiative diagnosis of tuberculosis in man.

The meeting will continue six days, and its proceedings are to be published. Every veterinarian can be a member of this Congress, and will be entitled to receive the printed transactions on payment of \$2.00 to Mr. Masson, 120 Boulevard St. Germain, Paris.

AMONG the novelties of interest to the profession we are pleased to notice the opening of a new veterinary school in Australia, the "Melbourne Veterinary College," a reference to which will be found on another page.* Mention is also made of the establishment of two new veterinary journals in Italy, one the *L'Ercolani*, to be published at the school of Modena, and the

*Deferred to May issue.

other, the *Giornale di Veterinaria Militare*, published at Udine. To both of these new periodicals we offer our best wishes, and in respect to the new veterinary school, we know that with the names that appear in the announcement it has issued, its success may be confidently predicted.

ORIGINAL ARTICLES.

HOG CHOLERA.

By D. E. SALMON, D.V.M., Chief of the Bureau of Animal Industry.

(A Paper read before the United States Veterinary Medical Association.)

Until very recently the literature of hog diseases was very confusing, and not less so in Europe than in America. In the period from 1880 to 1885 the French came to regard all epizootic swine diseases as *rouget*. The Germans at the same time were directing their attention almost entirely to an identical disease in their country which they described under the name of *rothlauf*. Each of these words is synonymous with our erysipelas and was evidently used to designate this disease because of the predominance of the skin lesions. In this country the prevailing hog diseases have been referred to under the name of "hog cholera," a term which also indicates the chief organs affected, which with this disease are those composing the intestinal tract.

Early in 1886 I published a series of articles in which I demonstrated that hog cholera was a distinct and very different disease from *rouget* and *rothlauf*. This opinion was based not only upon the symptoms and course of the disease, but upon the lesions found upon post-mortem examination and the microbe associated with them. This microbe was discovered in the laboratory of the Bureau of Animal Industry in 1885.

About the time these articles were written Schütz described a disease in Germany under the name of *schweineseuche*, which differed from both *rothlauf* and hog cholera. It was a contagious disease and the prominent lesions were found in the lungs. Klein had previously described (1884) under the name of pneumo-en-

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teritis, a disease somewhat similar in lesions to our hog cholera. Too much stress, however, was apparently laid upon the lung lesions and the germ was not described with sufficient detail to admit of identification.

The bacterium of hog cholera, as studied in our laboratory, is found chiefly in pairs, appearing as elongated ovals from $1\frac{1}{16}$ to $1\frac{1}{8}$ micromillimeters in width. Occasionally longer elements are observed reaching $1\frac{1}{8}$ micromillimeters in length, and even longer under certain conditions. In liquid media the bacterium is motile and its movements resemble very closely *bacterium termo*. That the bacterium which we have studied is not *bacterium termo* is shown by the fact that it does not liquify gelatine and that there is not the slightest putrefactive odor emitted from the culture containing it, and also by its pathogenic effects. This germ may be stained with an aqueous solution of methyl violet and various other aniline stains. When colored with methyl violet, particularly when in coverglass preparations made from the organs of affected animals, the central portion is much paler than the periphery. A dark border extends entirely around the germ and although it may be thicker at the ends than at the sides it does not give that distinct appearance of polar staining that is seen in the germs of rabbit septicæmia. Like most other germs, the staining varies somewhat with its age and conditions, and its size varies also according to the medium in which it is grown, and also to a certain extent when obtained from different outbreaks of the disease.

The most recent microbe described by Klein in connection with pneumo-enteritis resembles considerably the germ which we have found in hog cholera. It is motile in liquid cultures and is described as from two to three micromillimeters long. It is also said to be spore-bearing and that pigeons are wholly insusceptible to it. The germ of our hog cholera does not produce spores, so far as our observation goes, and it is fatal to pigeons when inoculated in considerable doses.

In virulent outbreaks the percentage of mortality produced by this germ is very high. In a recent outbreak in the District of Columbia out of 139 animals of a herd, about one hundred per-

ished within the brief space of two months. This is over 70%. Many of the animals died without previously evincing any noticeable symptoms of the disease.

In many of these there was more or less ulceration in the large intestine, showing plainly that the animals may be very severely affected and be a source of infection for others for a considerable time without presenting any symptoms to indicate their condition. About one-third of the cases in this outbreak showed lesions of a hemorrhagic character. The most common was an infiltration of the cortical portion of the lymphatic glands with blood. Sometimes the entire gland on section, was found to be similarly affected. Accompanying this condition of the lymphatics is usually a very large spleen, its great size being due to engorgement with blood. Next in frequency were the hemorrhagic lesions of the serous membranes. These consisted of extravasations of various sizes. In about 10% of the animals the kidneys were hemorrhagic. As a rule in these hemorrhagic cases the mucous membrane of the stomach is deeply reddened and there is hemorrhage into the membrane and in rare cases on its surface. The mucous membrane of the large intestine was affected in about the same manner as that of the stomach. The membrane of the small intestine was usually normal. Our experience has been that the early cases in an outbreak are hemorrhagic and are succeeded by those with ulceration of the large intestines and cellular infiltration of the lymphatics.

Ulcers of the large intestine were found in 36 out of 49 cases, or about 75%. They vary from very slight to very severe and extensive lesions involving in a small number nearly the whole of the membrane of the cœcum and colon. In a few cases the lesion was not limited to the mucous membrane, but extended into the muscular wall, producing considerable local inflammation and thickening of the serous membrane. In rare cases necrosis and cellular infiltration had made the intestinal wall so friable that it broke when handled. In five cases the lower ilium was ulcerated, but the ulcers seemed to have no relation to Peyer's patches. The age of the ulcers cannot be determined, as the process of necrosis and ulceration seems to vary a great deal in rapidity. We have frequently found a combination of old ulcers with recent hemor-

rhagic lesions. These would appear to resemble the condition found in chronic pleuro-pneumonia, where we find a cyst and at the same time a fresh inflammation of the lung tissue. What conclusion is the pathologist to draw from this condition? Is it the result of an increase of virulence of the bacteria which have been preserved so that they are able to penetrate and multiply in the tissues which have previously resisted them, or is it simply the result of an extension of the bacteria, which have not increased in virulence but which have been limited to the affected part of an organ? The answer to these questions must have great influence on our views of the preservation of virus and the sudden appearance of virulent epizootics which apparently have their starting point in mild chronic cases.

Peritonitis, pleuritis and pericarditis are not uncommon complications usually accompanying old ulcers. These are possibly caused by septic bacteria gaining entrance through the ulcers. We have demonstrated that cocci closely resembling those of suppuration and various other microbes are usually found in the peritoneal cavities in chronic cases.

The lesions found in the lungs on post-mortem examination were either simple collapse or lobular broncho-pneumonia which apparently followed it. In about fifteen per cent. of the animals examined, one of the smaller ventral lobes was airless throughout and moderately enlarged. Viewed from the surface the diseased lobe is bright red, dotted with minute pale, grayish and yellow points of a diffused, hazy outline, each not more than one millimeter in diameter. They are usually ranged in groups of four and represent the ultimate air cells filled with cellular exudate. The larger bronchi are also occluded. Microscopic sections reveal a broncho-pneumonia. The process seems to be accompanied with very little inflammation. The desquamation and proliferation go on in the alveoli and smallest air tubes until they are occluded by the casts. Of the forty-nine animals of the herd mentioned seventeen were found with collapse and eight with broncho-pneumonia. In this outbreak then, more than one-half of the animals had some defect of the lungs. It is to be remembered, however, that when healthy hogs are slaughtered, it is common to find more or less collapse of the same lobes as were found affected in these cases.

There is an idea among some investigators that the lung lesions of infectious pneumonia or swine-plague and the bowel lesions of hog cholera are produced by the same bacteria and, that the seat of the disease depends entirely upon the organ through which the germ is introduced into the body. To illustrate this matter we have injected the germs of hog cholera directly into the lung tissue, but we have not produced hepatization by such inoculations. Either the germ is diffused through the body, producing lesions of the spleen, lymphatics and intestines, or the animals recover. We have found, however, that in the lung lesions accompanying hog cholera there are a much greater number of germs than in the healthy portions of the lungs. It is evident, therefore, that in these collapsed portions the germs find favorable conditions for their multiplication, and it is not unlikely that the collapse develops into broncho-pneumonia because of their multiplication. To determine whether the microbe of contagious pneumonia was present in the affected portions of the lungs from animals affected with hog cholera, sixteen rabbits were inoculated from the same number of lungs. Of these, eight lungs were affected with simple collapse and eight with broncho-pneumonia. Of these sixteen rabbits, four survived and the remainder died of hog cholera. The germ of contagious pneumonia or swine-plague evidently was not present in any one of these cases.

When either cultures of this motile germ, or the spleen or intestines of hogs which have died of cholera, are fed to susceptible pigs, there is produced the most remarkable and extensive ulcerative lesions of the intestines. In the most severe cases there is complete necrosis of the mucous membrane of the cæcum and colon and often of the ilium, while in cases produced in the ordinary course of infection the small intestine is seldom if ever so affected.

The germ of hog cholera produces fatal effects when inoculated in mice, rabbits, guinea-pigs, pigeons and pigs.

In July, 1886, we recognized a different and distinct disease of swine in which the most prominent lesions were found in the lungs. This affection appears to begin as a broncho-pneumonia, but this extends—the lung tissue becomes completely hepatized,

then caseous. The inflammation also extends to the pleura, and sometimes causes it to become attached to the thoracic walls. Sometimes cavities are found between the adherent pulmonary and costal pleura, which contain a yellowish, turbid liquid; and frequently the diaphragm is firmly attached to the principal lobe. The parts of the lung first attacked become converted into homogeneous greenish or yellowish white masses, sharply defined from the surrounding tissue, and caseous in nature. This lesion is generally limited to a few lobules, but in some cases the whole lobe is involved.

Generally there are no intestinal lesions, but sometimes these are present, and on superficial examination might easily be confounded with hog cholera ulcers, particularly if the difference between the two had never previously been recognized. Doubtless this superficial resemblance in the intestinal changes seen in the two diseases may account for peculiarities in the descriptions of swine-plague by some authors which cannot well be explained in any other way.

The intestinal lesion in swine-plague is a yellowish croupous exudate, attached to the mucous surface in irregular masses varying greatly in size. This exudate may be easily detached, when the mucous membrane beneath it is found to be pale and slightly depressed. At a later stage, in severe cases of the disease, when the inflammation has a diphtheritic rather than a croupous character, the necrosed mucosa sloughs off, leaving a superficial erosion or a shallow ulceration.

This malady, so distinct in its lesions, is associated with and undoubtedly caused by a microbe which differs radically from that found in hog cholera. When stained by an aqueous solution of methyl violet or an alkaline solution of methylene blue the two extremities of the longer axis are deeply stained, while between these colored masses there is a transverse band without any color, bounded on the sides by a very faint line. These microbes so stained are oval and 1 to 1.2 micromillimeters in length by 0.6 to 0.8 of a micromillimeter in breadth. When grown in liquid cultures and examined fresh, instead of an oval it presents the appearance of a double micrococcus, that is of two spheres united at

their edges. It has no motion and is probably identical with the micrococcus described in my report for 1884, but which on account of pressure of other work and lack of assistance was imperfectly studied at that time.

This germ is fatal when inoculated in mice, rabbits, guinea-pigs and pigs, and occasionally so when given to fowls and pigeons in large doses.

Let us now compare these two maladies more carefully in order to bring out the points of difference.

Taking the germs first, we find that of hog cholera to be motile, while that of swine-plague never presents any evidence of motility. This difference is a very striking and radical one. The appearance after staining is almost equally marked, providing we examine stained coverglass preparations made from the organs of affected animals. In the one case we have a long oval element with a dark border and a pale center; in the other we have a short oval element, staining darkly at the extremities and with an unstained transverse band across the median portion.

The hog cholera germ grows actively on the cut surface of potatoes, while the other microbe refuses to grow at all in that condition.

The hog cholera germ resists drying for a long time and will grow after it has been kept dry for one or two months, but the swine-plague microbe dies in a very few days (three or four) after being dried.

The former multiplies in drinking water and remains alive for three or four months after being placed in it, while the latter does not multiply at all in such water and dies within two or three weeks.

Mice are killed by the hog cholera germ in from eight to sixteen days, by the swine plague in from two to six days.

Rabbits die from hog cholera inoculations in from six to nine days, but they only live from twenty hours to six days after inoculation with swine plague.

Fowls have resisted all our inoculations with the hog cholera microbes; the swine plague germ kills them when inoculated in large doses.

The hog cholera microbe constantly produces in mice and rabbits enlargement of the spleen and numerous foci of coagulation necrosis in the liver; the swine plague germ never produces these lesions.

If cultures of the hog cholera bacteria are fed to pigs which have been kept without food for a day, they produce the most extensive necrosis of the mucous membrane of the large intestine and often considerable ulceration of the ilium, invariably causing fatal results. Cultures of the swine plague germ may be fed under exactly the same conditions without producing the least effect.

The hog cholera germ inoculated directly into the lung tissue produces no hepatization or marked lesion of any kind, but is followed by the development of a hemorrhagic or ulcerative case of hog cholera. The swine plague germ similarly inoculated produces extensive and violent inflammation at the point where it is deposited.

These differences in the germs are plain and unmistakable, and the lesions found in the two diseases are not less distinct.

Swine plague is a disease in which the principal lesions are found in the lungs; in hog cholera it is the intestines, the lymphatic glands, and the spleen which are most conspicuously affected.

In swine plague the alveoli and small bronchi are plugged with cellular masses, the pleura is thickened and may be adherent, the lung tissue may become necrosed and caseated. When the lungs are affected in hog cholera the lesion is generally of a hemorrhagic character, the tissue soft, spongy, and the alveoli are full of air.

Schütz found no intestinal lesions in the few cases of swine plague which he has examined. In a large proportion of cases we have found a croupous exudation. Occasionally the mucous membrane is secondarily necrosed, in other words, diphtheritic. By the sloughing of the superficially necrosed membrane an excavated ulceration is formed. In hog cholera the ulceration seems to be produced primarily by a necrosis of the mucosa, due to the direct effect of the bacterial poison. This necrotic tendency is well shown in the liver of mice, rabbits and guinea-pigs. There is no croupous deposit seen at any time. The injured mucosa may

become extensively infiltrated with cells, often forming masses of embryonal tissue which, pushing upward from the submucosa by continued multiplication, furnish the old ulcer with its projecting button-like slough.

We have here two diseases, therefore, clearly defined and produced by entirely different organisms. But they are not always uncomplicated, since we occasionally find both of them in the same herd at the same time. The germ of swine-plague seems to be a widely distributed organism and nearly always has pathogenic properties, though its virulence is not always sufficient to enable it to destroy swine. That is, in all but its pathogenic qualities it is identical with the germ of rabbit septicæmia; with that of fowl cholera; with that of the disease called by the Germans *wildseuche*. We have found a variety of this same germ frequently present in mucus from the nostrils of healthy pigs and possessing sufficient virulence to kill rabbits by inoculation.

The presumption from these facts is that this germ is widely distributed, that under certain conditions when the lungs are weakened by irritation and disease which may result from overcrowding, inhaling dust, or exposure to the inclemencies of the weather, it may invade the lung tissue, increase its pathogenic properties and in certain cases become a virulent communicable disease.

The hog cholera germ is so far as we know peculiar to that disease. It has not been described as present in the diseases of any other species of animals, except when these are produced by inoculation. In its general biology it has many features in common with the bacillus of typhoid fever of man.

Now what is the nature of hog cholera? Prof. Law and the writer have frequently referred to it as a contagious fever, but a recent author insists that it is not a contagious disease at all and that it is a strictly infectious disease. There is a good opportunity for hair splitting here, but let us not be beguiled by word-juggling when we have the facts before us. Hog cholera is a bacterial disease; it is communicable from animal to animal by inoculation; when a diseased animal is introduced into a herd the malady rapidly progresses until nearly every animal in the herd becomes affected; the virus may be and is carried into all parts of the coun-

try by diseased animals. With these facts before us can we say the malady is strictly infectious and that any one who speaks of it as contagious is entirely wrong? It seems to me that such an assertion is supremely ridiculous and shows a lamentable ignorance of modern classification of disease.

While writing this I have taken a few standard works from my shelves at a venture, and every one, including Ziegler's *Lehrbuch der pathologischen Anatomie* (4th ed.), Flügge's *Die Mikroorganismen* (2nd ed.), Putz *Die Seuchen und Herde Krankheiten*, and Roll's *Thierseuchen*, include all bacterial diseases under the general term of "Infectious diseases." Ziegler then divides infectious diseases into *miasmatic diseases*, *contagious diseases* and *miasmatic-contagious diseases*. Flügge divides the infectious diseases according to the nature of the parasites causing them into *contagious obligatory parasites*, *contagious facultative parasites*, and *non-contagious facultative parasites*.

It is not my intention to insist upon any classification in this connection. No student of pathology can be ignorant of the wide differences which exist between various standard authors. What I desire is to draw your attention from this never ending controversy as to the exact meaning which should be ascribed to the words infectious and contagious and to concentrate it upon the facts in reference to this particular disease.

The same author insists in the most positive terms that hog cholera is an extra-organismal infectious disease. In other words that the parasite is one the natural habitat of which is the soil, that the hog obtains it from the soil and not through contagion, and that once planted in the soil this microbe remains there and multiplies for an indefinite period. Where are the records of the experiments which demonstrate this proposition put forth in such emphatic terms? Have you seen them? I have not.

In the laboratory of the Bureau of Animal Industry we have plodded along for three years laboriously endeavoring by means of experiments to throw some light upon the biological characters of this microbe and the conditions under which it may be preserved. We have observed after many outbreaks that fields and pens have been safely used within three to six months after the disappearance of the disease. We have frequently observed the same fact

in connection with infected pens at our experiment station in Washington. We have endeavored to be more precise than this, however, and have infected soil in various situations with the bacteria of this disease, and then inoculated rabbits from this soil at regular periods. In this way the gradual loss of virulence in the microbe can be easily determined. At first the rabbits die in from six to eight days after inoculation, but this period grows longer and longer until finally the rabbits live twenty days and then the germ is no longer able to kill them. In our experiments we have found that this microbe loses all pathogenic properties after it has been in the soil but a few days longer than two months.

The indication is, therefore, that the hog cholera germ is not one which preserves its existence indefinitely in the soil, or which can justly be considered an extra-organismal parasite. That it can multiply and live for a limited period in water and soil we have demonstrated, but in each case it soon loses its virulence and dies.

How then is this microbe preserved from season to season, as it plainly is in certain cases, even when the disease has apparently died out in the meantime. Prof. Brown of England has frequently expressed the opinion, with which we coincide, that chronic ulcerations of the intestine may exist in unsuspected animals and that these harbor and disseminate the microbe for an indefinite period. We find here, consequently, a condition somewhat analogous to what we find in contagious pleuro-pneumonia. The germ multiplies in the chronic lesion, for a time it appears to have but little virulence, and then suddenly and for reasons which are not well understood it is distributed as a most fatal contagion. Even the original host, which has carried it around with impunity for months, may suffer a fresh invasion and die from a hemorrhagic type of the disease.

If there are other means by which this germ is preserved during the considerable periods of time which elapse between outbreaks of this malady we have not yet succeeded in demonstrating them.

Hog cholera is, therefore, a strictly contagious disease. The virus as a rule appears to gain entrance to the body by way of the alimentary canal, and by means of soiled and infected food and water. It is possible that the respiratory passages also serve to

admit the parasite. The theory taught by one of the early investigators of this malady, that a few germs wafted by the air might settle upon a slight abrasion of the skin and thus gain entrance to the body and produce fatal effects, is scarcely tenable in the light of recent experiments. We have found that hogs may be safely given from one-fourth to one-half of a cubic centimetre of virulent cultures by hypodermic injection. Each drop of such cultures contains about two millions of microbes, and hence from twelve to twenty-five millions of these germs may be placed beneath the skin without danger to the hog. By the side of these vast numbers, of what significance is the half dozen germs which according to this gentleman are borne by the breeze and dropped upon an abraded surface of the skin? I must confess that I am skeptical of the disease ever being produced in this manner.

I shall not go into the details of preventive measures in this paper. You are already familiar with the principles of sanitary science which are applicable to diseases of this class. What you are doubtless interested in is the new points which may have been brought out by our investigations.

The most interesting of these is our attempt to confer immunity by inoculation. We soon found that there was no indication for attenuating the virus for this purpose, because the strongest virus might be introduced hypodermically with impunity in considerable doses. Now as the stronger a virus is the higher degree of immunity it produces, you can see that there is every reason for using the fresh unattenuated cultures. But even these are not sufficient. We made many experiments and found that hogs might safely be inoculated with one-fourth to one-half cc. for the first dose and that the second dose might safely be increased to two and three cc. showing that some degree of immunity had been gained. These twice-inoculated animals, however, were still unable to withstand exposure in an infected pen, and could not be fed the virus without fatal results.

We have tested many disinfectants and have determined the exact strength in which they should be used and the period of time necessary to kill the germ. The most useful agent for disinfecting manure and soil is undoubtedly lime. This in the proportion of one-fourth to one-half of one per cent. is speedily fatal

to this microbe. The fact that lime is of value as a fertilizer and that it is frequently used to the extent of fifty to seventy-five bushels per acre, which would be sufficient as a disinfectant, shows the value of this agent for freeing the soil and various organic accumulations about farms from the contagion of this disease.

Having referred to the main points of this destructive malady which have been elucidated by the experiments made under my direction, I shall conclude with a few opinions of European investigators in reference to points which have been contested.

You will remember that it has been asserted in the most emphatic terms that there is but one disease in this country which goes under the name of cholera, and that it is identical with the *schweineseuche* of Schütz. To settle this question I have sent to the leading investigators of Europe cultures of the germ of hog cholera, together with copies of my reports and asked for their opinions. I trust you will bear with me while I read what they have since written on the subject:

M. Nocard after receiving this culture says editorially in the *Recueil de Medecine Veterinaire* for Jan. 15, 1888, p. 8.,

"Recapitulating, we see that under the name of *Rouget, mal rouge*, erysipelas, etc., etc., there may be confounded at least three very different maladies:

"First. The *rouget*, properly speaking. Second. The hog cholera of the Americans, probably identical with the swine-fever or infectious pneumo-enteritis of the English, and without doubt also with the diphtheritis of the pig recently observed in Sweden and in Denmark. Third. The infectious pneumonia, or *schweineseuche*, of the Germans, or swine plague of the Americans."

Dr. Rietsch of Marseilles, who has recently studied the outbreak of swine disease near that place, writes under date of Feb'y 15:

"The microbe which I send you is not the same as that you discovered in hog cholera. The hog bacterium grows at 20° more slowly than mine and at lower temperature there is reached a point where the hog microbe no longer grows, while our bacillus still forms very fine colonies.

"The gelatine colonies differ in appearance.

"Finally your hog microbe is more motile and a little smaller, it seems to me, in the same condition.

"The microbe of Marseilles differs from that of Schütz by its motility, that of Löffler-Schütz being non-motile. The disease of Marseilles seems also to differ from the *schweineseuche* by the absence of œdema at the point of inoculation, by slower progress of the disease, by the pathological phenomena being found in the intestine almost always, while Schütz observed almost nothing in the intestine and never mentioned ulceration."

In a subsequent paragraph he adds, that my hog cholera microbe certainly differs much more from those of septicæmia of rabbits, *schweineseuche* of Loeffler-Schütz, wildseuche of Kitt and fowl cholera of Perroncito and Pasteur than these germs differ from each other.

The germ discovered by M. Rietsch at Marseilles is very closely allied to our hog cholera microbe and probably differs no more from it than specimens of our germ differ when obtained from different outbreaks in this country.

Dr. Cornil, who is now a member of the French Senate and who certainly is one of the very highest authorities on micro-organisms in France, writes me under date of Feb. 10, 1888, as follows:

"We have had occasion to study, M. Chantemesse and I, the disease of swine that you described two years ago under the name of swine plague and in your last volume under the name of hog cholera. We have observed an epidemic in June last at Paris, and at the end of the year another epidemic at Marseilles. We have verified the accuracy of your description and we are about making experiments of vaccination."

I have one other letter to which I attach the very greatest importance, because it comes from the highest authority in the world on pathogenic bacteria. Under date of Feb. 23, 1888, Dr. Robert Koch writes:

"The culture of hog cholera bacteria sent to me came in good condition, and I directed Dr. Esmarch, one of the assistants in the Hygienic Institute, to make a few experiments with it. He was able to confirm all of the results obtained by you in inoculating and feeding mice and guinea-pigs. This micro-organism does not correspond with any of the species of pathogenic bacteria known here, particularly not with those found in swine diseases.

According to private communications, however, this organism seems to be identical with the one found in swine plague in England and Denmark. Yet I cannot come to any definite conclusion in the matter, as I have had no opportunity thus far to make a comparative investigation."

This letter effectually settles the question as to whether American hog cholera is identical with the German *schweineseuche*. As I have said before, no one who has studied the germs of fowl cholera, rabbit septicaemia and swine plague, could confound with them for a moment the germ of hog cholera. The differences are radical and irreconcilable, but it has been difficult to convince some of our professional friends of this fact.

To complete the chain of evidence I may add that Prof. John Lundgren of the Veterinary Institute of Stockholm, Sweden, has recently brought to my laboratory the germ of the disease as it exists in Sweden and he is now comparing it with the germs of our hog cholera. I may say now that these microbes are morphologically identical and that they differ in biological characters only to about the same extent as germs from different outbreaks in various sections of the United States are found to differ from each other. The lesions of the disease correspond to our hog cholera.

We may conclude, therefore, that the outbreaks of swine disease during the last year in Sweden, Denmark, and at Paris and Marseilles in France, were practically identical with our hog cholera, and that the German *schweineseuche* is an entirely different and distinct disease.

DESCRIPTION OF SOME SPECIMENS OF PLEURO-PNEUMONIA CONTAGIOSA.

Presented by A. W. CLEMENTS, V.S.

(Abstract of remarks at the semi-annual meeting of the United States Veterinary Medical Association at Baltimore, March 20, 1888.)

Mr. President and Gentlemen:—Pleuro-pneumonia contagiosa is generally defined to be a contagious or infectious disease, manifesting itself by certain characteristic lung lesions, and generally

accompanied by a sero-fibrinous pleuritis; the bronchial lymphatic glands are enlarged and softer than normal. The first case to which I will call your attention is one of left-sided acute pneumonia; it involves nearly the whole of the left lung, which, as you will see, is greatly enlarged, weighing forty-five pounds, while the right lung, which is healthy, weighs but six pounds. Thus you will see that the diseased lung contains thirty-nine pounds of exudate. The pleura is covered with exudate over the affected lung, and there is also a very abundant exudate about the organs in the superior mediastinum, a complication to which I shall call your attention later on. On section, this lung presents the lesions characteristic of the disease. This is a very typical case, and one upon which nobody who had ever seen even a picture of a lung in this disease could possibly make a mistake. The lung is solid, the parenchyma is hepatized, and there are varying shades of color, from a reddish pink to a dark red, depending upon the amount of blood present. The parenchyma is at the same time very moist (oedematous), and the interlobular tissue is filled with a jelly-like exudate, opaque white in appearance. This varied color of the parenchyma, compared with the white opaque color of the interlobular exudate, gives rise to what is termed the marbling of the lung. Very soon fibrous connective tissue appears in place of the interlobular exudate, and also around the bronchous in the center of the lobule. This new growth of interlobular connective tissue takes place, beginning at the border of the lobule, so that between two lobules we have two narrow bands of connective tissue with the exudate still remaining between them. The connective tissue may continue to grow so as to entirely fill up the interlobular space, or, as is more commonly the case, this takes place in some parts while in others the two bands separate and we have beginning necrosis. This separation continues in a certain direction and finally incloses a varying number of lobules, sometimes only one. When the ring is completed a sequestrum is formed and what we call chronic pleuro-pneumonia is the result. The bronchi resist the necrotic process longest, so that it is common to see a necrosed mass connected by bronchi with the healthy lung-tissue. Finally the bronchi ulcerate through and are seen hanging from the wall of the cyst as fibrous prolongations; these bronchi are in

the great majority of cases occluded, but in some cases a fine probe may be pushed through them. Finally these projections slough off, and their ends becomes covered by the connective tissue, which grows from the lung, surrounding the necrosed mass. Sometimes ulceration may take place in a bronchous at the border of the diseased portion before complete occlusion has taken place, and so establish direct communication between the contents of the cyst and the healthy lung. This is the only way in which there is bronchial communication with a pleuro-pneumonia cavity. A bronchous is often seen leading toward a cyst, but instead of penetrating the wall it passes to the side of it. The new formation of peri-bronchial connective tissue, together with the pressure of the walls of the cavity, serve to completely occlude the bronchi.

What causes the necrosis is hard to say. One would think that the plugging of the blood vessels leading to the part would be sufficient, but we see the same necrotic processes, on a very much smaller scale, in the bronchial glands. Perhaps the virus which causes the disease has the property of producing necrosis, and at the same time of plugging the blood vessels. As soon as sequestration is complete, disintegration of the necrosed mass takes place, and the cavity becomes filled with serum or, more commonly, with a purulent material, in which more or less of the sequestrum remains.

What I have said refers to typical pleuro-pneumonia. Unfortunately many cases which we are called upon to diagnose are by no means typical. For example, a herd of cows came to Baltimore from outside of the quarantine limits, from a region where pleuro-pneumonia was not supposed to exist. Soon after arrival two of them presented symptoms of acute contagious pleuro-pneumonia. One was slaughtered, and at the post-mortem the following lesions were found: double pleurisy, both lungs enlarged and solid on pressure. On section of the lungs the following appearances were noticed: there was interlobular exudation precisely like that seen in acute pleuro-pneumonia contagiosa, but it affected the greater portion of both lungs, and there was no hepatization of the parenchyma except in a very small area of one lung, and there the consolidation was of the broncho-pneumonia type. When number two was slaughtered, much the same appearances were

noticed, but in this case only one lung was affected, and there were necrotic cavities in the interlobular connective tissue. The parenchyma was not consolidated.

Next comes a very interesting series of cases in which were scattered foci of consolidation throughout the lung. On section, these solid areas presented typical pleuro-pneumonia cysts in the areas, large enough to be seen easily with the naked eye; these areas varied in size from two or three lobules to a single lobule; and from a single lobule down to foci the size of the head of a pin, many of which could be seen in a single lobule. These small foci had very much the appearance of tubercles, but on closer inspection a small necrotic center was to be seen, even in the smallest, and on microscopic examination these centres were seen to be composed of a few air-cells which had undergone necrosis precisely like that in the larger cyst. Now there were cases of typical pneumonia in the same herd, and the evidence in considering them as pleuro-pneumonia is that in some cases a whole lung was involved, in others a greater portion of a lobe, in others a small group of lobules, together with single lobules and small foci, varying in size from a pea to a pin's head in the same lobule. The same characteristics were presented in all of them, even to the smallest.

In conclusion, I wish to call your attention to a few specimens which I think are very interesting and instructive. In case No. 1 we have acute pleuro-pneumonia contagiosa of one lung, and in addition to this, an exudation and new growth of tissue surrounding the base of the trachea, and extending back through the superior mediastinum, involving the lymphatic glands, the œsophagus and the posterior aorta. This exudation looks precisely like that in the lung, and the lymphatic glands present many minute foci of necrosis. Case No. 2 presents the same changes around the trachea, but in this instance extends upwards so that it could be seen half way up the neck. It also extends downward by the large bronchi into the substance of the lungs, where there is chronic pleuro-pneumonia involving a considerable area in one lung. Case No. 3 shows exudation and new growth of tissue in the superior mediastinum, extending to the posterior border of the lung and involving all the organs in this region. The character of these changes shows the process to have been of some standing, while the

only invasion of the lung tissue is at the root of both lungs in an area about half the size of a hen's egg, where there is undoubted contagious pleuro-pneumonia, the inter-lobular exudation being directly continuous with that in the superior mediastinum. The changes in the mediastinum are of much longer standing than those in the lungs, and certainly point to the fact that we may have what is termed pleuro-pneumonia contagiosa without any lung lesions.

LUNG PLAGUE BY MEDIATE CONTAGION.

BY PROF. JAMES LAW.

I am always glad to read the earnest utterances of my friend and co-worker, Dr. J. W. Gadsden, and I need not say that I sympathize with him in the omission of his paper at the Consolidated Cattle Growers' Convention. Congratulation is due him, however, in that he has now had the privilege of placing it before a no less appreciative audience, and one better able to canvas its merits. That there is a substratum of truth in his position no one acquainted with the lung plague will deny; that the virus is not so tenacious of life as that of small pox, cow pox, glanders and tuberculosis, for example, will be readily conceded; but the extreme position taken in his paper, "that the contagion can only be communicated by contact with the living diseased animal," very few indeed can be brought to admit.

To begin with, I venture to assert, and without fear of successful contradiction, that Dr. Gadsden himself does not believe this. He has become so impressed with the perishable nature of the lung plague virus, that he has, perhaps unconsciously, stated his case much more strongly than he meant to. No one of the opponents of mediate contagion hold that "*actual contact with the living diseased animal*" is essential to the propagation of the disease. It is well to demonstrate this before proceeding to consider the position which I believe he is willing to contend for: "*that the virus is so easily destroyed that it is unnecessary to disinfect a building where cases of lung plague have been.*"

To return then to the question of "*actual contact.*" Dr.

Gadsden will at once admit that the susceptible animal need not come into *actual contact* with the diseased tissues in order to be infected. It is the products of the diseased lungs, coughed out or breathed out, that become the medium through which the infection is conveyed. Here then incontestibly the virus is conveyed through a *medium*—the *infected mucus*, or the *infected air*. The case then is *not one of actual contact with the living diseased animal*.

Take another case. In our large distillery stables the cattle are fixed in separate stalls or boxes, from which, as a rule, there is no exit until they leave to go to the butcher. In these, therefore, according to the doctrine of the *necessity of actual contact with the living animal*, the disease could only progress along a single line of stalls, and would be impotent to extend across the narrow passageway to the next. But who ever heard of lung plague confining itself to a single line of stalls in a distillery stable, or to two adjacent lines of stalls in which the animals faced each other? More than this, if an insusceptible animal was sandwiched in between two susceptible ones, it ought, according to the *actual contact* theory, to prove an insuperable barrier to the further propagation of the disease along that line of boxes, because *actual contact* could not take place across the intervening boxes occupied by the insusceptible animal. But we all know that the intervention of one or two such insusceptible subjects proves no barrier to the propagation of the disease along a given line of stalls. Here there can be no *actual contact*, hence the resulting infection is *through the atmosphere or some other medium*.

Another common occurrence in the distillery stable is no less conclusive. There is a tendency to a more rapid propagation of the infection along a given line, but it is always in a definite direction, determined by physical conditions. The troughs into which the swill is run are gently inclined from one end to the other of a line of forty or fifty cattle, and the swill is run into the higher and flows slowly along to the lower one. The rapidity of the propagation of the disease depends a good deal on the end of the trough at which the first diseased animal happens to stand. If at the elevated end, the propagation of disease along the row of cattle is rapid, but if at the depressed end, the propagation of

infection is often slower. Manifestly it is carried by the flowing swill from the higher to the lower end of the trough, and infects the susceptible animals in its course. Here again there is the rapid conveyance of the *contagion through the medium of the food* and independently of all actual contact with the living diseased animal.

One case more, drawn from the enemy's camp. Dr. Francis Bridge, whose great experience and sound judgment are endorsed by Dr. Gadsden, relates the infection with lung plague of one herd by the use of a drinking horn which had been used a short time previously for drenching lung plague victims in another herd. This case is further attested by Mr. Thos. J. Edge, Secretary of the State Board of Agriculture in Pennsylvania. Here then *the horn, soiled with the infecting mucus, is the medium of contagion*, there having been no actual contact.

That cattle have escaped the disease though put in infected stables, proves nothing at all, or, if it proves anything, it proves too much. So of the exposure of cattle to contact with the diseased lungs after they have been removed from the body.

To give such instances any value two things must be demonstrated: first, that the lungs of this particular animal contained the virus in a potent state, and second, that the animals brought into contact with this lung were animals susceptible to this infection.

Many individuals are not susceptible to a given infection, and many insusceptible at one time are found to be susceptible a short time after. I have made an unsuccessful inoculation of vaccina direct from the vesicle, though the virus proved extra active on the other cases vaccinated at the same time. I have a few months later successfully vaccinated the previously refractory subject, and have seen him undergo quite a severe attack. If I had inoculated this one subject only the first time, would it have been fair to blame the virus? Assuredly not. The scientific spirit says with Professor Walley, "One swallow does not make a summer." Much more, *the absence of a swallow does not make a winter.*

If all members of a given genus were equally open to contract a *contagion*, we would be made acquainted with epizootics of a very different type, and a fatal disease like lung plague or rinder-

pest would soon burn itself out. We would find in every infected herd not twenty per cent., forty per cent., or sixty per cent., but one hundred per cent. affected. Every epizootic would be the counterpart of the equine influenza of 1872, and the more fatal epizootics would bid fair to disappear from the face of the earth.

The escape of a certain number proves nothing, in the face of *one well authenticated case of mediate contagion*. Twenty years ago it was hard to convince the most experienced English physicians that tuberculosis was contagious. Men and women had grown old in the consumption hospitals without contracting the disease, and every physician of such a hospital was a living witness against contagion. For a long time glanders was thought to be *not contagious*, and even in our own time this was held by many with regard to chronic cases. Does the escape of the majority of the horses in a stable, or of the one horse working for weeks or months in the same team with a glandered one, prove that glanders is not contagious? Yet this is just the kind of evidence that proves (?) lung plague incommunicable by mediate contagion.

The potency of the infection varies greatly in different cases of the same disease, and this applies to infectious diseases generally. Hence we have our so-called epidemics, in which the affection is not only more violent but also more communicable, and hence more prevalent, and we have our intervals of respite, in which the disease smoulders with few and mild cases.

To return to the lung plague. The process of inoculation determines the specific inflammation in any part of the body where the virus is inserted, and if made in a place where the inflammation will not prove fatal the system is thereby fortified against a second attack of the plague. But in this there is *no actual contact with the living diseased animal*. I have carried the liquid hundreds of miles in a bottle, and by its successful inoculation have saved the inoculated herd. If *mediate contagion* were impossible there would be no objection to inoculation, for no infection could come of the presence of the lung exudate in the absence of *the living diseased animal*. But if the virus *apart from the living animal* cannot infect, what is the use of inoculation?

I submit that in place of furnishing negative evidence, which is put out of court at once by the production of one positive case, Dr. Gadsden should take up the many positive cases on record. Let him take up Fleming's works, or any European work on veterinary sanitary police, or let him take my monograph on lung plague and dispose of the cases therein related.

Before concluding, however, I am in duty bound to refer to the case of the Shufeldt distillery stables at Chicago. In the light of facts the Shufeldt distillery case was a triumph of disinfection, and not a disproof of the need of disinfection.

The stables were retenanted in January, 1887, and when I arrived in Chicago in the following April, I still found abundant evidence of the liberal use of whitewash containing chloride of lime. That the flooring was not removed was of less account, considering that the swill had escaped freely from the troughs and filled up the interval beneath the floor, *where it had undergone a strongly acid fermentation. Now the germ of lung plague lives in an alkaline or neutral medium and is not adapted to survive in the presence of a powerful acid.* The material beneath the floor then was a disinfectant of this germ. But, besides this, the whitewash liberally applied to walls and roof was of necessity even more liberally applied to feeding troughs and floor.

One point apparently in favor of Dr. Gadsden's position remains, though he has failed to specifically state it. One row of cattle was put in a line where no whitewash had been applied. The commissioners informed me that a partition had been put up and the whitewash applied up to this, and permission secured to fill up to this point. The owners, however, found it desirable to put in another row of cattle, and accordingly moved the partition to accommodate them. These and these alone stood on a floor that had not been whitewashed? Was it therefore not disinfected?

If any one has any doubt on this subject, I extend him the invitation to enter one of our New York cow stables on which one of our disinfecting corps is exercising its skill, and to stay for fifteen minutes if he can. He will have no further doubt about the disinfection. Our active agent is chloride of lime, which gives off so much free chlorine that none but those inured to the work can stand it, and these habitually wear sponges over their

mouths. The free chlorine penetrates everywhere, into every crack and interstice, into every spongy body, and destroys every living germ. Nor is this a mere transient action. It continues to give off free chlorine for days and weeks, and this proves in every sense a thorough disinfectant.

This explains the result in the Shufeldt distillery stables. Not only the whitewashed portion but the single rows of stalls adjoining were thoroughly disinfected, having been enclosed under the same low roof, bounded by a close partition and subjected for weeks to chlorine emanations from the extensive interior wall and floor. It was, I repeat, a triumph of disinfection.

I regret that I cannot furnish many other experiments in the same direction from Chicago, for after my arrival every emptied stable was thoroughly disinfected and we never had a recurrence of lung plague in a disinfected stable.

One case, however, may be cited. In May we found a case of fatal lung plague in the hands of Timothy Flynn, who kept but one cow in a secluded locality, apart from other cows, between the river and the canal. On turning over the old records, I found that Timothy had lost the predecessor of this cow out of the same stable in March, and that the second cow had been obtained from the stock-yards some time later, and that the stable had never been disinfected. The stock-yards authorities were under a promise; which in my time they faithfully lived up to, to allow no cattle to enter the yards except such as came by rail and from outside Cook county. There is therefore every presumption that Flynn's cow contracted the disease from the stable, as have many others in my experience. See my "*Lung Plague*."

I repeat what I said at the outset, that Dr. Gadsden does not believe that *actual contact with the living diseased animal* is necessary to infection. He allows that infection takes place through the expired air, and that this infection can operate at some little distance. He allows that the encysted sequestra, cut off from all vital connection with *the living diseased animal*, remain for a variable time infecting. I believe he will even allow that the swill flowing along the troughs in the distillery stables can convey the infection to the further end of the row. He is with us therefore in believing in *mediate contagion*.

Our difference is one of *degree*, not of *kind*.

I think Dr. Gadsden will agree with us further that certain conditions favor the retention of virulum and that certain other conditions favor its destruction. He will agree, for example, that the following agencies are inimical to the germ: heat and moisture, an acid environment, free exposure to air, to light and to electrical changes. He will agree that the following will favor its prolonged vitality: desiccation, exclusion of light and air, a neutral environment, and the absence of electrical storms. He will allow further that if the carefully garnered virus is kept cool it will for a length of time retain its power of producing the specific inflammation in the part of the bovine animal inoculated.

We agree then that the virus does not lose all power the moment it leaves the living body, and that under favorable conditions it will preserve its virulence longer than in other and unfavorable conditions. Neither he nor we can say exactly how long its virulence is retained in any particular case. Occasionally the survival of virulence is unpleasantly demonstrated by the reappearance of the disease in animals placed in an infected stable. The course of wisdom, therefore, is to make quite sure and disinfect *all infected premises*. I appeal with confidence to our record in Chicago in justification of this course and challenge comparison with the records of Great Britain, where infection from buildings is to a certain extent denied.

As the infection in Australasia and South Africa is carried into new herds by inoculation, and as in New York we find cases of disease in large herds in which inoculation is universal, we are compelled to class inoculation and infected stables as among the fruitful causes of the maintenance of the lung plague. No country that practices the one and neglects the disinfection of the other, succeeds in a complete eradication of the disease.

Dr. Gadsden nobly endorses our work in the extinction of the infected herd. Let him hold up our hands also in the matter of disinfection of all infected things, and he can contribute materially to the speedy and complete extirpation of the plague.

DISEASES OF THE SKIN AMONG DOMESTICATED ANIMALS.

By GEORGE MULLER, PH.D., Docent in the Royal Veterinary School
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(Translated by Wm. S. Gotthell, M.D., Instructor in Dermatology at the N. Y. Polyclinic,
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Skin diseases are common enough among our domestic animals, but present by no means such varied symptoms as they do in the human subject.

This may be partly due to the fact that a number of skin diseases do not occur in the lower animals at all; but it is largely caused by the neglect from which dermatology has suffered at the hands of veterinarians. Diagnosis is rendered difficult by the hairy and generally pigmented skin, which frequently masks the dissimilarity of the most heterogeneous eruptions. The pig alone has a dermal covering analagous to that of man; but of all our domestic animals the pig is the one least affected by disorders of the cutaneous surface.

The horse, dog and sheep are most commonly troubled with this class of diseases.

The classification of dermatoses most in vogue is quite simple. Veterinarians speak of *acute* and *chronic* cutaneous disorders. This is not satisfactory, as many maladies, like the polymorphous eczema, may be either acute or chronic.

A division into *parasitic* and *non-parasitic* skin diseases is more useful, although there are a number of mykotic dermatoses concerning whose etiology the authorities do not agree. Nevertheless we had better accept and extend this classification; since a causal division is undoubtedly the ideal pathological classification.

Any attempt to classify skin diseases upon the pathologico-anatomical findings is prevented by the fact that one and the same anatomical change is found in the most varied dermatoses, and further because many of these conditions have not yet been especially studied.

For this latter reason more especially, it becomes impossible for us to use Auspitz's excellent classification; for seven out of his nine classes are based upon their etiology, and two only upon their pathological anatomy.

We will consider diseases of the skin in the lower animals under the following heads :

I.—NON-PARASITIC SKIN DISEASES.

- 1.—Erythema simplex.
- 2.—Dermatitis erythematoza.
- 3.—Eczema.
- 4.—Prurigo.
- 5.—Acne.
- 6.—Pemphigus.
- 7.—Urticaria.
- 8.—Erysipelas.
- 9.—Dermatitis gangrænescens.

II.—PARASITIC SKIN DISEASES.

a.—*Caused by Vegetable Parasites.*

- 10.—Alopecia.
- 11.—Favus.
- 12.—Herpes tonsurans.
- 13.—Dermatitis Canadensis (Axe).
- 14.—Stomatitis pustulata contagiosa.

b.—*Caused by Animal Parasites.*

- 15.—Scabies.
- 16.—Acarus.
- 17.—Dermatitis pruriginosa—(Rivolta).
- 18.—Hæmatopihus and Trichodechtes.
- 19.—Ixodes, Dermanyssus, Pulex, Simulia, Oestrus, Ochro-myia, Lucilia, Leptus.

I.—ERYTHEMA SIMPLEX.

This occurs in animals as an acute process affecting the entire integument, and is seen as a moderate hyperæmia of the upper layers of the corium.

A hyperæmia of this kind may be caused by external irritants, such as traumata, chemicals, high or low temperatures—in short, by anything which can cause dilation of the blood-vessels and hyperæmia of the skin. In dogs the irritation of ammoniacal urine often causes an erythematous eruption in the vicinity of the meatus.

The symptoms consist of a vivid arterial reddening of the skin, which disappears on pressure. It is, of course, only visible on unpigmented spots, and can only be seen in animals under certain special conditions. The affected part is almost always evenly injected, a macular eruption, such as is sometimes seen in erythema hominis, being extremely rare.

Itching is rarely present in pure erythema in dogs. As a rule the affection disappears without leaving any trace, as soon as the cause is removed. Only when the hyperæmia has been very intense is there subsequent desquamation of the cuticle; or a pigmented spot is left behind, which slowly fades away.

The treatment of erythema is to be commenced with the removal of the cause. Then leadwater, or carbolized lotions, and ointments of zinc oxide or salicylic acid may be used. Finally, when there is much itching, solutions of nitrate of silver may be employed.

2.—DERMATITIS ERYTHEMATOSA.

This is distinguished from erythema simplex in that the stratum mucosum is swollen from exudation and cell emigration, and that *sometimes* the stratum corneum is raised and serous vesicles are formed, which may be ruptured.

D. erythematosa merges into eczema, and is seen especially in the sheep in the form of buchweizenausschläges, (fagopyrismus). This is seen when sheep are fed with the various kinds of polygonaceæ, especially polygonum fagopyrum, and are subsequently exposed to the action of the solar rays. Many explanations of this peculiar action have been given. The most probable one is that the use of this variety of food causes increased circulatory activity, and then the heat of the sun causes a kind of "erythema solare."

On the other hand it has been claimed that it is not the polygonaceæ as such which causes the eruption, but parasitic fungi of this species of food which come in contact with the skin of the animals, and cause the eruptions—especially where the increased solar heat renders its development rapid.

We have not space to discuss the arguments for and against these theories.

The erythematous dermatitis caused in this way is seen not only in sheep, but is occasionally seen in white pigs and on unpigmented spots of skin of horses and cattle.

It is generally localized on the head and is accompanied with considerable itching. There are sometimes congestive conditions of the respiratory mucous membranes, and even of the brain.

It is peculiar that the disease does not appear in white animals with black streaks, nor in animals kept in stalls, nor in animals that are only turned out to grass in dull weather; and that it disappears at once as soon as the diseased animal is brought into a dark place. A more or less obstinate desquamation of the cuticle remains after the disease is gone.

Treatment is indicated by what has already been said.

3.—ECZEMA.

Eczema in the domestic animals may be acute or chronic, and passes through the same stages as does the disease in the human subject.

There is a hyperæmia of the skin, with serous infiltration of the individual papillæ and emigration of white corpuscles into them. This forms the stadium papulosum. The exudation increases in the papillæ; the corneus layer is separated from the rete malphigi and we get the stadium vesiculosum. If the corneus layer is strong enough to resist the exudation for a time, the contents of the vesicles become milky, and eventually purulent, in consequence of leucocytic emigration.

In other cases the vesicles break, the skin is diffusely reddened over larger or smaller areas, at the site of each vesicle there is a loss of the epidermis, and the exudation trickles freely over the surface. This is the stadium madidans. The exuding fluid soon dries up into crusts and scabs, the color and consistency of which vary with the quantity of cellular elements they contain. We then have the stadium crustosum sive impetiginosum. After the efflorescence has disappeared, there persists for a time an over-production of epidermis, causing a loose scaliness of the surface. This is called the stadium squamosum.

It is rare, however, to observe this schematic course of the disease in its entirety. The hairy covering and the pigmentation

of the skin cause single stages to be easily overlooked. In many eczemas the papular merges at once into the squamous stage. Others again develop at once from a dermatitis erythematosa (see above). And in most cases the animals themselves obliterate the characteristic features of the disease.

For eczema, especially in the more acute forms, is a fairly itchy malady and so incites the animal to rubbing and scratching that the deeper layers of the skin are soon involved in the inflammation.

1. In the *horse* eczema is seen as:

a. *Schwindflechte* (humid tetter).—A papular eczema, but seldom developing into vesicles, and generally passing directly into the desquamating stage; it is often seen at the time of the change of the hair.

b. *Mauke* (Schmutzmauke, Schrendenmauke,—Grease).—This is an eczema occurring at the back of the fetlocks from injuries of various kinds. It is vesicular, but soon passes into the stadium madidans and the stadium crustosum.

c. *Raspe*.—A chronic eczema, which develops from a dermatitis erythematosa and becomes squamous without going through the intermediate stages. It is distinguished by a considerable thickening of the skin. Its favorite seat is the inner surface of the knee of the anterior leg and the hock.

d. *Mahnengrind* and *Schweisgrind*.—A pustular eczema, appearing on the parts covered with long hair, the comb and the tail. It is usually overlooked for a long time, on account of its location, and hence important structural changes in the skin and permanent alopecia may take place.

e. *Kleinflechte* and *Schuppenflechte* (Hungerräude).—A slowly spreading squamous eczema, appearing by preference upon the head and around the root of the tail. The primary papular and vesicular stages do not usually occur.

2. In *cattle* eczema occurs as *Kleinflechte* and *Schuppenflechte*. But there is a form of *Grease* (see above) which is peculiar, and is known as:

Schlempemauke.—This is a simple eczema, which as a rule goes through all the stages of that disease. It begins at the dis-

tal end of the hind legs and may spread to other portions of the body. It occurs in cattle which have been fed with large quantities of potatoes, especially with potato mash, raw potatoes or potato plant. The active agent is believed to have been found in the noxious principles contained in the potato plant, or evolved from it in the preparation of the mash (solanin, fusil oil, organic acids, large quantities of potash salts); but we have as yet no certain knowledge in this respect.

A malady analagous to schlempemaanke has been observed after the use of grapes as food (*Traubenkammkrankheit*.)

3. In the *sheep* eczema appears as :

a. *Schwindflechte* (*false scabies*).—A papular eczema, with subsequent desquamation of the cuticle, appearing by predilection upon the neck.

b. *Maulgrind* (*Maulräude*).—A circumscribed vesicular eczema, which rapidly becomes crustaceous and is seen in young animals in the vicinity of the mouth.

c. *Regenfaule* (*wet Räude*).—In consequence of continuous rains, sheep exposed in the fields suffer from a softening of the epidermis of the skin of the upper parts of the body. There develops in consequence thereof a simple eczema, which usually runs a regular course, and may be followed by a not inconsiderable loss of wool.

4. In the *pig* eczema is seen as :

Rufs (*Pechräude*).—This is a pustular eczema, which soon goes over into the stadium impetiginosum, is usually chronic in its course, and is dependent ultimately upon a scrofulous dyscrasia.

5. In the *dog* eczema appears in the most varied forms upon the back, head, neck, outer surfaces of the extremities, etc. It is especially old and well-bred dogs (Pinscher, Leonberger, Jagdhunde) which are subject to eczema; and perhaps this has led to the idea that eczema canis is a constitutional disease, of which the skin malady is only a symptom; very much as inflammation of the joints is an external symptom of gout. But the theory is as little proven as is that other one which would make eczema of dogs of mycotic origin. We will make no mistake if we say that eczema canis *per se* is a purely artificial malady; but that with

certain constitutional changes the nutrition of the skin and its power of resistance to traumata may be so lessened that the occurrence of eczematous eruptions from external irritants is greatly favored.

In spite of the multiformity of appearance of the disease in consequence of the violent scratching and rubbing, we can distinguish three chief types of the malady.

The *first type* appears as small, irregular spots. The eruption begins as an *eczema papulosum*; the papules rapidly become vesicles, *stadium vesiculosum*; and this runs into the *stadium madidans*. The *stadium crustosum* follows less rapidly.

The *second type* tends to spread peripherically. It begins as *eczema papulosum*. The isolated papules are scratched open, or change into pustules. They then form small crusts, under which the regeneration of the epidermis goes on.

The *third type* is eminently disposed to become chronic. The short primary stages are usually overlooked, and a large surface of the diseased skin is found swollen, infiltrated, at first white and later covered with crusts which, in consequence of the scratching, are generally stained with blood. Later on the partial loss of hair, the thickening of the skin, and the marked epidermic desquamation alone remain.

The *treatment* of eczema is greatly impeded by the impossibility of applying protective dressings, and of preventing the animals from scratching and rubbing themselves.

After removing the causes and thoroughly cleansing the affected portions of skin, we may use:

a. In the *stadium papulosum* and *vesiculosum*, cooling and protective *salves* (ung. zinci, plumbi, diachylon. hebr., præcipitat. alb., salicylatum) or *powders* (zinc. ox. 1, amylum 5.)

b. In the *stadium madidans* and *impetiginosum*, drying and astringent *salves* (ungt. tannic., plumbi tannici, acidi borici, (Gresswell); or *powders* (ac. salicyl. or iodoform with amylum or cort. quercus); or *solutions* (sol. argent. nitric. 1: 15, sol. hydrarg. bichlorat 1: 100 to 200.)

c. In the *stadium squamosum* and in all chronic eczemas with much infiltration of the skin, alkaline soaps, concentrated solu-

tions of caustic potash, pix liquid, carbolized oil, carbolized glycerine, chrysarobin, ichthyol, iodoform (Popow), naphthalin (Schadrin.)

In the case of dogs it may be necessary to take into consideration the above mentioned more remote internal causes by using purgatives (aloes, calomel or arsenic.)

4.—PRURIGO.

The affection known by this name is of rare occurrence in horses, cattle and dogs, and has been but little studied. It is an itchy eruption and is *probably dependant upon internal causes*. There are generally spread over the entire rump isolated, small, softer or harder nodules, projecting but little above the normal level of the skin, and accompanied by a most intense itching. The consequent scouring soon ruptures the papules, and they become covered with a blood crust. All further changes of the skin occur in consequence of the rubbing and scratching.

The *treatment* of this very obstinate, but *not incurable* dermatosis has consisted of the exhibition of laxatives, diuretics, arsenic, and the local application of weak solutions of caustic potash, carbolic acid, salicylic acid, corrosive sublimate, pix liquida, etc. The best results seem to have been attained by care of the skin and attention to the digestive organs.

Several authors have also observed in the horse and cow an itching *without papulation*; it is to be regarded as a neurotic affection, analagous to the pruritus cutaneous of man.

5.—ACNE.

This is an eruption similar to the acne vulgaris of man. Single or grouped lentil to bean-sized inflammatory nodules appear upon the skin. Each one of them is in connection with one or more sebaceous glands, and emits a soft caseous material upon pressure. The malady appears in summer-time in the horse and the sheep, and may affect any portion of the body. It is especially apt to appear on the neck, only occasionally, when the itching causes rubbing and scouring, or when the affected portions of skin are pressed upon by the harness, the nodules may unite into

larger inflammatory masses, and finally lead to the formation of scars.

The therapy consists in emptying the papules and keeping the follicle mouths open. This is to be effected by pressure, the removal of scales, frictions with alkaline soaps, spiritus saponis kalinus, sublimate solutions, carbolized glycerine, and the like. As a rule the efflorescence disappears spontaneously when the weather becomes cooler.

6.—PEMPHIGUS.

This is a very rare skin disease and makes its appearance accompanied by an inflammatory fever. Upon a surface of normal or erythematous skin there appear pea to hen's-egg sized vesicles with serous contents. After rupture, the cover of the vesicle and the dried secretion form crusts upon the excoriated surface, and restitution of the epidermis occurs, leaving a shining skin behind. Two cases of the disease only have been recorded, and they in cattle; one by Seaman in 1852, and one by Loisch in 1858.

We may place midway between pemphigus and eczema vesiculosum, a dermatosis which affects horses especially. It appears in the neighborhood of the mouth and nares, and is described as *hespes labialis* or *heat eruption*. Accompanied by fever there appear closely aggregated lentil-sized vesicles, seated upon a reddened and moderately cedematous base. These burst or dry up, and form small yellowish or brownish crusts. In a short time the epidermis is renewed and shining, brightly pigmented spots are left behind; so that the disease rarely lasts longer than one week.

7.—URTICARIA.

By this we understand an acute dermatosis occurring in horses, cattle, pigs and dogs. Sharply defined wheals appear in consequence of sudden congestion, and then occurs serous imbibition of the corium and the corpus papillare.

These wheals can best be seen in the pig in consequence of its generally unpigmented and hairless skin. The lesions, as a rule, are dollar-sized, raised $\frac{1}{2}$ mm. above the normal skin, they are reddened or pale, and are surrounded by a pink areola. Under certain conditions the wheals may coalesce and form broad,

diffusely-reddened swellings. Under others again small hæmorrhages into the corpus papillare may cause them to assume a vivid dark-red color.

In all animals there is almost invariably fever and gastric disturbance with the eruption. In fact, in many cases digestive disorders must be regarded as the immediate causes of the appearance of the exanthemata. Besides this, urticaria may be caused in special cases by the use of very innocent foods, (raw potatoes, lentils, etc.,) and by various other causes; so that we are justified in regarding the urticaria of animals as identical with the human disease of the same name. It is in reality, a vasomotor disturbance of the skin, dependent upon the most varied irritants.

In horses and cattle urticaria appears as:

a. *Urticarial fever*—accompanied by a fever of invasion, the wheals appear simultaneously on various portions of the body and may form confluent spots as large as the palm of the hand. Very rarely distinct vesicles are developed on account of the abundant exudation into the wheals; they then burst and become scabbed. There is neither intense reddening nor itching. Treatment is unnecessary, as the malady quickly disappears of itself.

b. *Urticaria chronica*.—The wheals appear without febrile accompaniment, are isolated and soon disappear. They are, however, immediately replaced by new ones; and so the malady may last for months, and generally disappear only after vigorous purgation (aloes) has been brought on.

In the pig urticaria is called *nettle-fever*. It appears as above described, with gastric symptoms and considerable febrile movement. The exanthema as a rule disappears spontaneously in a few days; and only in rare cases is it necessary to use laxatives and clysters in addition to the relaxing food proper for these cases.

8.—ERYSIPELAS.

By erysipelas we mean an inflammation of the external integument occurring in the larger domesticated animals, mostly upon the extremities. It is distinguished by its tendency to rapid spreading, and is accompanied by a fever which deffervesces in a

few days as quickly as it has risen. There is no solution of the continuity of the integument, and it is followed by a small and insignificant desquamation.

Shortly after the outbreak of a more or less violent attack of fever, accompanied sometimes by gastric symptoms, a circumscribed spot of the epidermis is seen to be hot, tense and very painful to the touch. When occurring upon unpigmented skin a vivid redness appears, but little elevated above the level of surrounding parts, and spreads rapidly.

As a rule the redness finally involves the entire extremity and is divided from the normal skin by a raised or even swollen border. But rarely does it begin gradually.

Severe cases may go on to the formation of vesicles, the fluid of which is purulent. These soon burst, and leave small excoriations behind. Inflammation of the lymphatic vessels and glands belonging to the affected portion of skin are also occasionally observed.

This malady is undoubtedly caused by a streptococcus, and but rarely ends unfavorably. Treatment consists of lukewarm lavements with soap and water to relieve tension, and the inunction of carbolized oil or carbolized glycerine; all the so called specifics have proved worthless. Camphor ointment, iodine solution, resorcin and the subcutaneous injection of carbolized water or sublimate solution have no effect on the disease.

9.—DERMATITIS GANGRAENESCENS.

(Brandmauke).

Horses and cattle are occasionally affected by more or less extensive gangrene of the skin, especially upon portions of the extremities covered with white hair. Traumatism of various kinds—falls, solar heat, wet, ice, etc., may cause the affection. Scars are left after it has run its course. Very probably the circulation is interfered with by the injury—and hence occurs death of an area of skin.

Treatment consists of the removal of necrotic tissue, and the use of antiseptics.

(*To be continued.*)

COMMENCEMENT EXERCISES AMERICAN VETERINARY COLLEGE.

The commencement exercises of this institution took place at Chickering Hall on the first of March. A large number of the friends of the college, of the alumni and of the graduates honored the occasion with their presence. The Board of Trustees and the members of the faculty occupied seats on the platform, which was handsomely decorated with numerous bouquets of flowers designed for the new veterinarians. The orchestra, under the lead of Cappa, of the Seventh Regiment, added to the amenities of the occasion in a noteworthy manner. Prof Weisse, of the Board of Trustees, bestowed the diplomas upon the thirty-two recent graduates. Prof. Doremus presented the prizes. Dr. T. Pease, of the graduating class, delivered an excellent valedictory and Dr. Deems held the close attention of the audience by his address, one of the best ever delivered on a similar occasion.

Dr. M. W. Tritzschler received the gold medal offered by the Board of Trustees for the first best general examination. Dr. G. F. Pease received the set of books given by the Alumni Association for the second best general examination; Dr. H. B. Ambler carried off the gold medal given by the faculty for the best practical examination; and Dr. T. M. Buckley received the anatomical prize granted by Prof. Liautard; Dr. J. W. Harwood secured Dr. Michener's medal for the best paper presented and defended before the College Association.

The following gentlemen received the degree of Doctor of Veterinary Surgery. (D. V.S.)

Ambler, Henry Babcock.....	New York.
Ball, Harry McFadden.....	Ohio.
Bradley, John Linn.....	Pennsylvania.
Buckley, Thomas Michael.....	Brooklyn, N. Y.
Bueter, Bernard Henry.....	Kentucky.
Chapin, Myron Emerson.....	Massachusetts.
Decker, Elbert James.....	New York.
Dodge, Arthur Leroy.....	New Hampshire.
Engeman, William Albert.....	New York.
Faust, Otto.....	Poughkeepsie, N. Y.

Fletcher, Alexander	Ravenna, Ohio.
Ford, Frank Branco.....	W. Virginia.
Harwood, James Walter.....	Illinois.
Hexamer, Adolp Carl.....	New York.
Hoffman, Daniel R.....	Maryland.
Hunt, Frederick Wilcox.....	New York.
Jackson, Charles Clow.....	Missouri.
Lathrop, Gilbert Azur.....	Pennsylvania.
Lowe, Wm. Herbert, D.V.S.....	Paterson, N. J.
McDowell, Harris B.....	Delaware.
McIntosh, Albert Hooper.....	New Jersey.
McKillip, David William.....	Illinois.
Pease, James Frederick.....	Illinois.
Polk, Cyrus.....	Delaware.
Smith, George Augustus.....	New York.
Spurr, Alfred Isaac.....	Massachusetts.
Streets, John James.....	Illinois.
Tritschler, Morris William.....	Pennsylvania.
Van Nest, Robert Addy.....	Minnesota.
Vreeland, Edgar Avery.....	New Jersey.
Wilkinson, John Wright.....	Meadville, Pa.
Wright, John William Henry.....	New York.

VETERINARY APPOINTMENT.

As we go to press we receive information of the appointment of Dr. A. A. Holcombe as Territorial Veterinarian of Wyoming, in place of Dr. Hopkins, whose term of service has expired.

Dr. Holcombe needs no introduction from us to his colleagues in the profession, and no one better than he could have been selected to take the place of Dr. Hopkins. Dr. Holcombe was graduated from the American Veterinary College in 1876, and subsequently worked well for his alma mater for some time in the responsible post of Professor of Surgical Pathology.

On leaving New York, he was appointed Chief Veterinarian in the United States Army in Kansas, and subsequently became State Veterinarian in the same State, where he served for two terms. He is now called to a broader field of labor and usefulness, in which, as we all know, he will continue to do honor to his profession and to himself, as he has already and always done in similar responsible positions. We need not say that he has our best wishes.

SOCIETY MEETINGS.

PENNSYLVANIA STATE VETERINARY MEDICAL ASSOCIATION.

The annual meeting of the Pennsylvania State Veterinary Medical Association was called to order Tuesday, March 6th, at 11 a.m., at Donaldson Hall, Philadelphia, by the President, Dr. Thos. B. Rayner.

On roll call the following members responded: Drs. T. B. Rayner, W. D. Kooker, Geo. B. Rayner, W. L. Zuill, J. Curtis Michener, W. Horace Hoskins, James B. Rayner, Jno. R. Hart, M. J. Collins, John B. Raynor, N. E. Reinhart, J. R. Kélor, C. F. Weber, W. U. Custer, H. T. George, Zeno S. Keil, Chas. T. Goentner, Alex. Glass, W. H. Knight, Chas. Schaufler, Robert Gladfelter, R. S. Huidekoper, P. M. Minster, Jonathan Price, Francis Bridge.

The minutes of the previous meeting were read and approved, after which the Association proceeded to the election of officers as follows: President—Dr. Thos. B. Rayner; First Vice-President—Dr. J. Curtis Michener; Second Vice-President—Dr. W. U. Custer; Third Vice-President—Dr. H. T. George; Corresponding Secretary—Dr. W. S. Kooker, 416 N. 4th St., Phila., Pa.; Recording Secretary—Dr. Robert Gladfelter; Treasurer—Dr. W. L. Zuill; Board of Trustees—Drs. W. Horace Hoskins, W. L. Zuill, John B. Raynor, C. S. Goentner and J. Curtis Michener.

The following applicants for membership were favorably reported by the Board of Trustees, Drs. S. J. J. Harger and Chas. Williams, both of Phila.

After a recess of an hour the meeting re-convened, and under the reports of committees, the Association was informed that the Legislative Committee were ready to make their appeal to the State Government for recognition and protection as soon as the Legislature convened.

An amendment offered at a previous meeting for the creation of a permanent Committee on Veterinary Sanitary Police, was favorably acted upon, and the President appointed Drs. W. L. Zuill, N. Rectenwald and C. C. McLean upon that committee.

A similar amendment to create a Committee on Veterinary Intelligence and Education in the State, was favorably acted upon and the President appointed the following members: Drs. W. Horace Hoskins, Francis Bridge and C. F. Weber.

Under the head of new business, the resignation of Dr. J. C. Fly as a member was received, but not acted upon, owing to his holding the office of Treasurer, and his accounts were not ready to be audited.

The following amendment was offered to the By-Laws by Dr. Hoskins: That any member offering his resignation to the Association, voluntarily pledges himself to forfeit his certificate of membership to the Association.

A charge of violation of the code of ethics was made against Dr. John R. Hart, and was referred to the Board of Trustees. The latter sustained the charge and moved that six months be allowed the defendant to decide whether he would sever his connection with the People's Mutual Live Stock Insurance Company, or suffer expulsion from the Association. The committee's report was received and accepted.

Reports of cases being in order, Dr. J. Curtis Michener reported a case of transverse fracture of the patella, with recovery.

Inversion of the uterus in the cow, and the value of amputation of that organ, was brought up and evoked quite a lengthy discussion by many of the members.

It was decided to hold the next meeting at Easton, and that Drs. Goentner, Bridge and Keil prepare papers for the same.

After the transaction of some minor business the meeting adjourned.

W. HORACE HOSKINS.

KEYSTONE VETERINARY MEDICAL ASSOCIATION.

At a regular monthly meeting of the Keystone Veterinary Association held on February 4, 1888, at the Veterinary Department of the University of Pennsylvania, Dr. Zuill called the meeting to order at 8 o'clock.

At roll call eleven members responded.

After the usual legislative business had been gone through with Dr. Formad began a very able and instructive address on Tumors, in which he stated he wished our members to all assist as much as possible in bringing any that they might have in their collections, so as to make it as complete as possible.

He presented a very complete classification of them on the blackboard and placed them in the order of their frequency.

Fibroma, the first on the list, he stated to consist of a simple collection of connecting tissue. There are two varieties, the hard and soft, the former more common in man. Myxoma always starts as fibromia, also false muroma is of this variety. Specimens were then exhibited from neck of mule and testicle of horse. In regard to sipoma the Doctor said it was found as frequently in animals as man, always grew peupheral and is a fibroma filled or infiltrated with fat.

An enormous sipoma taken from the leg of a dog by Dr. Zuill was then presented for inspection, together with numerous other beautiful specimens from the college museum, among which was a polyphoid myxoma which occurred in the ventricle of the brain of a horse, producing wonderful cerebral disturbances before death. Under the head of condroma and ostro condroma, so common in man, and which reach enormous proportions at times, there were no specimens to present. The Doctor said ostio-orma was a true bone tumor caused by irritation of the bone substance.

Ostiophytis grow in muscles and are common in the shoulders of soldiers who have to carry heavy weapons, also frequently found in the brain of the African.

Odontoma is like ivory in composition and structure.

Muroma is made of pure nerve tissue, develops slowly and is very painful. A specimen from the radial nerve of horse was presented. The Doctor said cutaneous muroma was a cause of neuralgia; it is *non*-medulated.

Myoma is made up of muscular tissue.

Rhaldomyoma is congenital, usually occurring in kidney, common in human practice but rare in veterinary. A specimen from kidney of pig was shown.

Angioma constitutes the "birth-marks" in man.

Lymph angioma causes large eyelids and thick lips in man; not seen in animals. Lymph angioma is benign and the Doctor has seen it in pigs.

Onychoma is a thickening of the epidermis; occurs as corns under harness, etc. A specimen from the museum was then presented, which was taken from a

horse. They may reach a great length and appear as a horn. Dr. Glass saw one from the back of a cat.

Papilloma, or warts, are common in animals as well as man, usually hard, but soft when occurring in mucous surfaces. A wonderful display of these tumors was presented in the oral cavity of a dog.

Admoma usually occurs in the mammary gland and other vacinos glands. Several specimens from the mammæ of bitches were then shown. To distinguish admoma from cancer, in the former the skin is freely movable, while in the latter it ulcerates.

Under the head of cysts there was a retention cyst of a mule containing sebaceous material. Dr. Huidekoper spoke of the so-called "shoe-evil" as an instance of cystic degeneration.

The ovarian cysts of a cow were then exhibited and Dr. Formad said they were fibrid with cystic changes. There was one presented from ovary in bitch and also a cystic sarcoma of intestion and one of ovary in mare, and a dumoid cyst of a fowl filled at one time with feathers, also several others of like interest.

Dr. Formad showed fetal bones found in the fallopian tubes of a mare, showing a remarkable instance of extra uterine pregnancy.

Dr. Zuill mentioned a well authenticated case of a fetus found in the abdominal cavity of an ox. He also mentioned a case of hypospadiis thought to be a case of hermapheoditicism.

As the evening was far spent Dr. Huidekoper moved that Dr. Formad should continue next month, which was seconded and unanimously carried.

The meeting then adjourned.

At a regular monthly meeting of the Keystone Veterinary Medical Association which was held on March 3, 1888, at the Veterinary Department of the University of Pennsylvania, Dr. Zuill presided, the minutes of previous meeting were read and roll called, to which eleven members responded.

Dr. Formad resumed his lecture on Tumors, starting with actinomycosis, which is a disease affecting bone, and he considers it a disease closely allied to tuberculosis (Pearl Disease). It is of parasitic origin, otherwise it has the structure of sarcoma and he suggests the name of actinomycoma. There are one or more fine specimens of this disease.

The sarcomata are well represented in animals and many fine specimens were presented from the museum. The most common under this head are the melanotic sarcoma, but not cancer. It is most common in grey or light colored horses.

In man it generally starts in the eye and gives metastasis. It sometimes starts in the skin. It never gives metastasis to the skin but always to an internal organ. It proliferates to a large extent and produces enormous metastatic tumors.

Every black tumor (excepting those caused by accidental hæmorrhage) are melanotic. Numerous specimens were then exhibited.

Dr. Hoskins mentioned a remarkable case that was situated in rectum of a horse which subsequently broke down, discharged contents and animal recovered. Melanotic tumors in horse are often situated in skin and especially about the natural openings. Prof. Zuill mentioned case where he thought the tumors nearly equalled the body weight of the patient. Numerous interesting cases were reported by several of the members.

Sarcomas are divided into two classes, the benign and malignant. The benign

grow slowly, are hard and are situated deeply; the malignant grow superficially and are in the soft lymph glands.

There was a very remarkable specimen of myoloid sarcoma presented in the superior maxilla of a horse, occurring in the practice of Dr. Kooker, who stated it was caused by a traumatism, and the large bony growth was only about two weeks in forming and the last three days of the animal's life he experienced great difficulty in breathing, showing complication of the ethinoid and turbinated bones.

Spindle-celled sarcoma of a mule was then presented from the museum. This sarcoma, which in the start is comparatively benign, if removed is likely to return as round-celled and then to be malignant.

Dr. Formad then produced a beautiful drawing of the fungus of actinomy-cocis. Cases of epithelioma in nose of cat and paw of dog were shown. Squamous epithelioma of horses were then shown. The Doctor said these in their growth penetrate deep. Dr. Zuill also mentioned case of cancer of stomach, which is rare. There were a number of fine specimens of glandular cancer, principally from the mammary glands of bitches. Dr. Formad expressed his agreeable surprise in the size of the collection of pathological specimens, considering the age of the Department.

It was then moved by Dr. Goentner that a vote of thanks be tendered Dr. Formad for his excellent production, which was seconded and unanimously carried. This ended the exercises and the society adjourned.

CHAS. WILLIAMS, *Secretary*.

CORRESPONDENCE.

VETERINARIAN WANTED.

MONTGOMERY, ALA., March 12, 1888.

Prof. A. Liutard:

DEAR SIR.—On the recommendation of *Turf, Field and Farm*, I write to say that there is not a better location to be found for a graduated veterinary surgeon than in this city. We have had one *horse doctor* after another, but no veterinary surgeon, excepting one who soon got drunk and stayed so until he left for parts unknown. The one we have here now will not use the knife even for castration, yet he has made a good living from the first. This city contains nearly 30,000 inhabitants, and a good man can make money from the start. There is plenty of work in the county and towns within 15 miles.

I refer you to my old friend Col. S. D. Bruce of *Turf, Field and Farm*, as to who and what I am.

Very respectfully,

C. W. KENNEDY.

PRACTICE FOR SALE.

GREENSBURG, IND.

I have made up my mind to go South, on account of the failing health of my family, and will sell my property, one of the best and most commodious veterinary infirmaries and offices in the State, and a small dwelling of four rooms on adjoining lots, 62 x 120 ft, for \$2,500 and recommend a good man to my practice, which is worth from \$2,000 to \$2,500 per year, with no opposition amounting to anything, in this beautiful city of about 6,000 inhabitants and fine surrounding country; property very cheap at the price. Apply at once to

A. D. GALBRAITH, D.V.S.

NEWS AND SUNDRIES.

ANTIRABIC INOCULATIONS AT BARCELONA.—Dr. Ferran, who has charge of the pathological laboratory at Barcelona, has treated eighty-five cases of rabies by inoculation, without a death. Twenty-five of the patients had been bitten by animals positively known to be rabid. At first Dr. Ferran carried out the inoculation of his rabbits according to Pasteur's method, *i.e.*, by trephining. Recently, however, he has adopted a new, and, as he believes, an improved plan, *viz.*, the injection of a single drop of the emulsion of the medulla containing the virus into the anterior chamber of the rabbit's eye. This produces exactly the same effects in about the same time as the trephining method.—*Medical Record*.

GLANDERS IN NEBRASKA.—State Veterinarian J. Gerth reports that since April, 1887, to February, 1888, he has destroyed 361 horses suffering from glanders.

EXEUNT BUNNY?—It is announced that three agents of Pasteur have sailed for New South Wales with the hen cholera microbes to inoculate and exterminate rabbits in Australia.

A STITCH IN TIME.—It is stated that Dr. M. E. Johnson, assistant state veterinarian, was called a few days ago to Derby, Lucas Co., Iowa, where he found six cows, five hogs, three horses, and several dogs suffering from hydrophobia. He ordered that the animals be killed.—*National Live Stock Journal*.